Patent Claims

1. Vacuum plasma generator with an output (26, 26') for feeding a plasma discharge for the treatment of workpieces in a vacuum chamber, comprising:
   - a mains connection (6a) for the junction to an AC voltage mains,
   - a mains rectifier (6) connected to
   - a converter (7) with a control input (7a) for the setting and / or regulation of the converter output voltage,
   - a controlled full bridge circuit (13) connected to the converter output (7) with a potential-free generator output (26, 26'), which transposes the converter output voltage into pulses of 1 to 500 kHz, and, into the bridge (13) a potential-isolating transformer (14) is switched for the galvanic decoupling of the generator output (26, 26').

2. Generator as claimed in claim 1 **characterized in that** the voltage transformation ratio of the bridge circuit (13) with transformer (14) is maximally 1:2, preferably maximally 1:1.5.

3. Generator as claimed in one of claims 1 or 2, **characterized in that** the transformer (14) has a leakage inductance (16, 17) below 50 μH, preferably below 10 μH.

4. Generator as claimed in one of the preceding claims, **characterized in that** the converter (7) is a clocked converter, preferably a buck-boost converter for setting an output voltage, which is lower as well as also higher than the input voltage.

5. Generator as claimed in one of the preceding claims, **characterized in that** the bridge circuit (13) generates bipolar pulses.

6. Generator as claimed in one of the preceding claims, **characterized in that** the bridge circuit (13) comprises control means for the optional setting and/or regulation of the pulse behavior, such as the switching frequency, the duty factor, the pulse width and for setting the pulse curve form.

7. Generator as claimed in one of the preceding claims, **characterized in that** the bridge circuit (13) develops a pulse interspace between successive pulses.

8. Generator as claimed in claim 7, **characterized in that** the bridge circuit (13) shortcircuits the transformer (14) at the primary side during the pulse interspaces.

9. Generator as claimed in one of the preceding claims, **characterized in that** at least two bridge circuits (13) are connected succeeding the converter (7).

10. Generator as claimed in claim 9, **characterized in that** four bridge circuits are connected succeeding the converter (7).

11. Generator as claimed in one of claims 9 or 10, **characterized in that** to each bridge circuit (13) a transformer (14) is assigned and the secondary sides of the transformers (14) are connected in parallel.

12. Generator as claimed in one of claims 9 to 11, **characterized in that** the bridge circuits (13) are switched offset in phase.

13. Method for the production of a layer by reactive deposition out of a plasma, **characterized in that** the plasma is operated with a vacuum plasma current supply as claimed in one of claims 1 to 12.

14. Method as claimed in claim 13, **characterized in that** the generator output (26, 26') is connected with two deposition electrodes (3).

15. Method as claimed in one of claims 13 or 14, **characterized in that** dielectric layers are deposited reactively.

16. Method as claimed in one of claims 13 to 15, **characterized in that** the layer is deposited by sputtering, in particular magnetron sputtering.

17. Method as claimed in one of claims 13 to 16, **characterized in that** the layer is a hard material layer, in particular a reactively deposited metal oxide layer Me_xO_y.

18. Method as claimed in claim 17, **characterized in that** the hard material layer is an Al_2O_3 layer.

19. Method as claimed in claim 17 or 18, **characterized in that** the hard material layer is a mixed oxide, such as $(AlMe)_xO_y$, preferably $(AlCr)_xO_y$ and/or $(AlFe)_xO_y$.

20. Method as claimed in one of claims 13 to 19, characterized in that the crystalline structure of the layer comprises substantially an alpha phase and/or a gamma phase, the gamma phase being preferred.